

## Claims

1. An optimized interaction method of a Wireless Local Area Network (WLAN) WLAN user terminal selecting an access mobile communication network, comprising the steps of:
  - a. after a wireless connection between the WLAN user terminal and a WLAN access network is established, the WLAN access network or the WLAN user terminal initiating an access authentication procedure, and the WLAN access network sending a user identity request message to the WLAN user terminal;
  - b. after receiving the user identity request message, the WLAN user terminal determining network selection information to be currently carried according to a detecting result of whether the WLAN access network is changed or according to user selection information, and returning a message containing the determined network selection information to the WLAN access network; and
  - c. the WLAN access network judging whether the network selection information in the received message indicates one of the mobile communication operation networks to which the WLAN access network is currently connected; if so, sending an access authentication request from the WLAN user terminal to a mobile communication operation network indicated in the network selection information, otherwise, the network sending a notification signaling to the WLAN user terminal, the WLAN user terminal completing subsequent operations according to contents in the notification signaling.
2. The method according to claim 1, further comprising the step of presetting a mobile communication operation network with the highest access priority in the WLAN user terminal.
3. The method according to claim 2, wherein in step b, whether the WLAN access network is changed is judged according to WLAN access identification information, wherein the step of determining the network selection information comprises the steps of:
  - b1. the WLAN user terminal detecting identification information of the WLAN where the WLAN user terminal is currently located, judging whether WLAN access identification information and previous network selection information is stored in itself, if so, executing

step b2; otherwise, executing step b3;

b2. judging whether the currently detected WLAN access identification information is the same as that stored in itself; if so, taking the previous network selection information stored in itself as the network selection information to be currently carried and ending the current flow; otherwise, executing step b3; and

b3. taking the information of the mobile communication operation network with the preset highest access priority as network selection information to be currently carried.

4. The method according to claim 3, further comprising the steps of: after being successfully accessed to the mobile communication operation network indicated in the network selection information, the current WLAN user terminal updating the WLAN access identification information stored in itself with the currently detected WLAN access identification information, judging whether information of the current successfully accessed mobile communication operation network is the same as the previous network selection information stored in itself; if they are different, updating the previous network selection information stored in itself with information of the current successfully accessed mobile communication operation network, otherwise, not updating the previous network selection information stored in itself.

5. The method according to claim 4, wherein before the step of judging whether information of the current successfully accessed mobile communication operation network is the same as the previous network selection information stored in itself, the method further comprises the steps of: judging whether information of the current successfully accessed mobile communication operation network is the same as that of the mobile communication operation network with the preset highest access priority, if they are different, executing the step of judging whether information of the current successfully accessed mobile communication operation network is the same as the previous network selection information stored in itself; otherwise, updating the previous network selection information stored in itself.

6. The method according to claim 5, further comprising the step of: after the stored network selection information is updated, setting an effective life span for the current stored previous network selection information, the effective life span being used to set the stored content as invalid after timeout.
7. The method according to claim 6, wherein when the WLAN access network is not changed, the method further comprises the steps of: judging whether the effective life span of the previous network selection information stored in itself is timeout, if so, taking the information of the mobile communication operation network with the preset highest access priority as the network selection information to be currently carried; otherwise, continuing to take the previous network selection information currently stored in itself as the network selection information to be currently carried, and the effective life span continuing to be consumed.
8. The method according to claim 7, wherein the stored previous network selection information is a mobile communication operation network list.
9. The method according to claim 8, wherein the step of updating the previous network selection information stored in itself further comprises the steps of: judging whether the list space is full, if so, deleting the oldest network selection information record in the list and adding new network selection information record; otherwise, directly adding new network selection information record.
10. The method according to claim 6, wherein after being successfully accessed to the mobile communication operation network indicated by the network selection information, the method further comprises the steps of: judging whether information of the current successfully accessed mobile communication operation network is the same as the previous network selection information stored in itself; if they are different, after updating the previous network selection information stored in itself, resetting the effective life span of the currently stored previous network selection information, if they are the same, judging whether the current WLAN user terminal is accessed successfully using the previous network selection information stored in itself, if so, not updating the previous network

selection information stored in itself and continuing to consume the effective life span, otherwise, not updating the previous network selection information stored in itself and resetting the effective life span of the network selection information.

11. The method according to claim 4, further comprising the step of: after the stored network selection information is updated, setting an effective life span for the current stored previous network selection information, the effective life span being used to set the stored content as invalid after timeout.

12. The method according to claim 11, wherein when the WLAN access network is not changed, the method further comprises the steps of: judging whether the effective life span of the previous network selection information stored in itself is timeout, if so, taking the information of the mobile communication operation network with the preset highest access priority as the network selection information to be currently carried; otherwise, continuing to take the previous network selection information currently stored in itself as the network selection information to be currently carried, and the effective life span continuing to be consumed.

13. The method according to claim 12, wherein the stored previous network selection information is a mobile communication operation network list.

14. The method according to claim 13, wherein the step of updating the previous network selection information stored in itself further comprises the steps of: judging whether the list space is full, if so, deleting the oldest network selection information record in the list and adding new network selection information record; otherwise, directly adding new network selection information record.

15. The method according to claim 11, wherein after being successfully accessed to the mobile communication operation network indicated by the network selection information, the method further comprises the steps of: judging whether information of the current successfully accessed mobile communication operation network is the same as the previous network selection information stored in itself; if they are different, after updating

the previous network selection information stored in itself, resetting the effective life span of the currently stored previous network selection information, if they are the same, judging whether the current WLAN user terminal is accessed successfully using the previous network selection information stored in itself, if so, not updating the previous network selection information stored in itself and continuing to consume the effective life span, otherwise, not updating the previous network selection information stored in itself and resetting the effective life span of the network selection information.

16. The method according to claim 3, wherein in step b2, when the currently detected WLAN access identification information is the same as the WLAN access identification information stored in itself, step b2 further comprises the steps of: judging whether the user selection information is changed, if so, taking information of the mobile communication operation network with the newly-set highest access priority as the network selection information to be currently carried; otherwise, taking the previous network selection information stored in the WLAN user terminal itself as the network selection information to be currently carried.

17. The method according to claim 3, wherein the mobile communication operation network with the highest access priority is a home network of the current WLAN user terminal.

18. The method according to claim 3, wherein the WLAN access identification information is Service Set Identifier (SSID) or Access Point Identifier (APID) or MAC address of access point.

19. The method according to claim 2, wherein in step b, the step of determining the network selection information further comprises the steps of: judging whether the user selection information is changed, if so, taking information of the mobile communication operation network with the newly-set highest access priority as the network selection information to be currently carried; otherwise, taking the previous network selection information stored in the WLAN user terminal itself as the network selection information to be currently carried.

20. The method according to claim 2, wherein the mobile communication operation network with the highest access priority is a home network of the current WLAN user terminal.

21. The method according to claim 1, wherein the network selection information is placed in a user identification field with Network Access Identifier (NAI) format.

22. The method according to claim 1, wherein in step c, the notification signaling sent to the WLAN user terminal from the network contains mobile communication operation network information to be advertised, and the method further comprises the steps of: after receiving the notification signaling, the WLAN user terminal reselecting a mobile communication operation network, and obtaining network information corresponding to the selected mobile communication operation network according to network information in the notification signaling; and then sending a message containing the new network selection information to the WLAN access network and returning to step c.

23. The method according to claim 21, further comprising the steps of: the network waiting for a response message from the WLAN user terminal after sending the notification signaling, and actively sending a selection result request to the WLAN user terminal if not receiving a response after a period of time.

24. The method according to claim 21, further comprising the steps of: the network ending the current authentication after sending the notification signaling, the WLAN user terminal reinitiating an access authentication procedure to the WLAN access network after reselecting a mobile communication operation network, and sending access authentication information containing the new network selection information.

25. The method according to claim 1, wherein in step c, the notification signaling sent to the WLAN user terminal from the network notifies the WLAN user terminal that the current selected network is invalid and it is needed to download information of mobile communication operation networks, and the method further comprises the steps of: the WLAN user terminal judging whether it is needed to download information of mobile

communication operation networks, if so, the WLAN user terminal returning a response indicating needing to download network information to the network; the network advertising information of mobile communication operation networks to the WLAN user terminal after receiving the response; after obtaining information of mobile communication operation networks, the WLAN user terminal reselecting a mobile communication operation network and resending an access authentication request containing new network selection information to the WLAN access network, and returning to step c; otherwise, not implementing any processing or returning a response indicating no need to download.

26. The method according to claim 25, further comprising the steps of: the network waiting for a response message from the WLAN user terminal after sending the notification signaling, and actively advertising information of mobile communication operation networks to the WLAN user terminal if not receiving a response after a period of time.

27. The method according to claim 25, further comprising the steps of: the network ending the current authentication after sending the notification signaling, the WLAN user terminal actively initiating a network information download procedure if needing to download the network information.

28. The method according to claim 25, wherein the WLAN user terminal automatically selects information of mobile communication operation networks advertised by the network according to preset parameters.

29. The method according to claim 22, wherein the WLAN user terminal automatically selects information of mobile communication operation networks advertised by the network according to preset parameters.